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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/828,564	04/06/2001	Yogendra Joshi	361007-000012	6497
24239	7590	09/07/2005	EXAMINER	
MOORE & VAN ALLEN PLLC			PATEL, NIHIR B	
P.O. BOX 13706			ART UNIT	
Research Triangle Park, NC 27709			PAPER NUMBER	
			3743	
DATE MAILED: 09/07/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/828,564		JOSHI ET AL.	
	Examiner		Art Unit	
	Nihir Patel		3743	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on June 29th, 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 4-6, 13, 15, 16 and 33-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-12, 14, 17-22, 33-35 and 39-44 is/are rejected.
- 7) ☒ Claim(s) 23-32 and 36-38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed on June 29th, 2005 have been fully considered but they are not persuasive. **Referring to claims 1 and 43**, the applicant argues neither Andres or Ghoshal disclose a boiling enhancement structure that is disposed within the evaporator wherein the boiling enhancement boiling structure is a porous component that provides re-entrant cavities. The examiner disagrees. Ghoshal does disclose a boiling enhancement structure. In reference to boiling enhancement structure being a porous component that provides re-entrant cavities, the amended/original claims do not claim the boiling enhancement structure being a porous component that provides re-entrant cavities.

Referring to claims 39 and 41, the applicant argues that Andres fails to teach or disclose that the thermosyphon performance is substantially independent of thermosyphon orientation. The examiner disagrees. Andres states that **“the heat exchanger structure of the present invention is independent of gravitational and inertia forces. It is assured thereby that condensate will always collect within the area of the heat supply by the heating rod, the heating channel or the like and is evaporated by the heat source”**. In which the examiner regards as being independent of thermosyphon orientation.

Allowable Subject Matter

Claims **23 through 32 and 36 through 38** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **1-3, 12, 17 through 22 and 39 through 44** are rejected under 35 U.S.C. 103(a) as being unpatentable over Andres et al. (US 4,550,774) in view of Ghoshal (US 6,474,074).

Referring to claims 1-3, 17 through 22, 39-42, Andres discloses the applicant's invention as claimed with the exception of providing a boiling enhancement structure that is disposed within the evaporator. Ghoshal discloses an apparatus for dense chip packaging using heat pipes and thermoelectric coolers that does provide a boiling enhancement structure that is disposed within the evaporator. Therefore it would have been obvious to modify Andres's invention by providing a boiling enhancement structure that is disposed within the evaporator as taught by Ghoshal in order to improve the heat transfer process.

Referring to claim 12, Andres discloses the applicant's invention as claimed with the exception of providing an evaporator that comprises a first plate having an interior major surface and an exterior major surface; a second plate generally parallel to, spaced from and similar in planar dimension to the first plate, having an interior major surface and an exterior major surface, the interior major surface opposing the interior major surface of the first plate with a central parallel plane passing through the space there between, the second plate exterior major surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surfaces define an evaporator volume.

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Ghoshal discloses an apparatus for dense chip packaging using heat pipes and thermoelectric coolers an evaporator that comprises a first plate having an interior major surface and an exterior major surface; a second plate generally parallel to, spaced from and similar in planar dimension to the first plate, having an interior major surface and an exterior major surface, the interior major surface opposing the interior major surface of the first plate with a central parallel plane passing through the space there between, the second plate exterior major surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surfaces define an evaporator volume. Therefore it would have been obvious to modify Andres's invention by an evaporator that comprises a first plate having an interior major surface and an exterior major surface; a second plate generally parallel to, spaced from and similar in planar dimension to the first plate, having an interior major surface and an exterior major surface, the interior major surface opposing the interior major surface of the first plate with a central parallel plane passing through the space there between, the second plate exterior major surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surfaces define an evaporator volume as taught by Ghoshal in order to improve the heat transfer process.

Claims **8-11, 18-22, 40 and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over Andres et al. (US 4,550,774) in view of Anderson et al. (US 5,761,037).

Referring to claim 8, Andres discloses the applicant's invention as claimed with the exception of providing boiling enhancement structure that comprises a plate having a first major surface and a second major surface both surfaces having parallel grooves cut in them, the grooves in the first surface being perpendicular to the grooves in the second surface. Anderson

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discloses an orientation independent evaporator that does provide boiling enhancement structure that comprises a plate having a first major surface and a second major surface both surfaces having parallel grooves cut in them, the grooves in the first surface being perpendicular to the grooves in the second surface (**see figure 3A**). Therefore it would have been obvious to modify Andres's invention by providing boiling enhancement structure that comprises a plate having a first major surface and a second major surface both surfaces having parallel grooves cut in them, the grooves in the first surface being perpendicular to the grooves in the second surface as taught by Anderson in order to obtain better heat transfer.

Referring to claim 9, Andres discloses the applicant's invention as claimed with the exception of providing grooves in each surface that are cut to a depth that is at least one half of the thickness of the boiling enhancement structure plate. Anderson discloses an orientation independent evaporator that does provide grooves in each surface that are cut to a depth that is at least one half of the thickness of the boiling enhancement structure plate. Therefore it would have been obvious to modify Andres's invention by providing grooves in each surface that are cut to a depth that is at least one half of the thickness of the boiling enhancement structure plate as taught by Anderson in order to obtain better heat transfer.

Referring to claim 10, Andres discloses the applicant's invention as claimed with the exception of providing a boiling enhancement structure material that is selected from the group consisting of copper, diamond, and silicon. Anderson discloses an orientation independent evaporator that does provide a boiling enhancement structure material that is selected from the group consisting of copper, diamond, and silicon (**see column 4 lines 1-5 and lines 30-40**). Therefore it would have been obvious to modify Andres's invention by providing a boiling

enhancement structure material that is selected from the group consisting of copper, diamond, and silicon as taught by Anderson in order to obtain better heat transfer.

Referring to claim 11, Andres discloses the applicant's invention as claimed with the exception of providing a boiling enhancement structure that comprises open-celled porous foam. Anderson discloses an orientation independent evaporator that does provide a boiling enhancement structure that comprises open-celled porous foam (**see column 3 lines 55-65 and column 4 lines 1-10**). Therefore it would have been obvious to modify Andre's invention by providing a boiling enhancement structure that comprises open-celled porous foam as taught by Anderson in order to obtain better heat transfer.

Claim **14** rejected under 35 U.S.C. 103(a) as being unpatentable over Andres et al. (US 4,550,774) in view of Paal (US 5,051,814).

Referring to claim 14, Andres discloses the applicant's invention as claimed with the exception of providing a second plate that is formed with at least a portion of the heat-dissipating component from a single piece of material. Paal discloses a method of providing a stress free thermally conducting attachment of two bodies that does provide a second plate that is formed with at least a portion of the heat-dissipating component from a single piece of material. Therefore it would have been obvious to modify Andres's invention by providing a second plate that is formed with at least a portion of the heat-dissipating component from a single piece of material as taught by Paal in order to obtain better heat transfer.

Referring to claim 14, it has been held "that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice." In re Larson, 340 F.2d 965, 144 USPQ 347, 349 (CCPA 1965).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Nihir Patel whose telephone number is (571) 272-4803. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful the examiner supervisor Henry Bennett can be reached at (571) 272 4791.

NP
September 6th, 2005



Henry Bennett
Supervisory Patent Examiner
Group 3700